615-assignmentD - main - RStudio

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Untitled1* | Buoy.qmd | Buoy_cleaning.qmd

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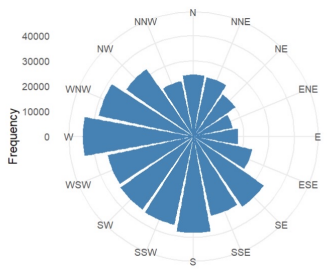
```r
library(dplyr)
library(ggplot2)

wind_data <- combined_data %>%
  select(WD) %>%
  filter(!is.na(WD))


wind_data <- wind_data %>%
  mutate(
    Direction = cut(
      WD,
      breaks = seq(0, 360, by = 22.5),
      labels = c("N","NNE","NE","ENE","E","ESE","SE","SSE",
                 "S","SSW","SW","WSW","W","WNW","NW","NNW"),
      include.lowest = TRUE,
      right = FALSE
    )
  )


wind_summary <- wind_data %>%
  group_by(Direction) %>%
  summarise(freq = n(), .groups = "drop")
```

Compiling all ye...
Cleaning and Or...

```r
ggplot(wind_summary, aes(x = Direction, y = freq)) +
  geom_col(fill = "steelblue") +
  coord_polar(start = -pi/16) +
  labs(
    title = "Dominant Wind Directions (1985-2024)",
    x = "Direction",
    y = "Frequency"
  ) +
  theme_minimal()
```



Question

What are the dominant strong-wind directions near NOAA buoy 44013 (Boston 20 NM East) based on long-term observations from 1985–2024?

Plot

I selected only those hours when the wind speed exceeded 10 m/s (about 20 knots), representing strong-wind events. I then grouped their wind directions into 16 compass sectors (N, NNE, NE, ..., NNW) and plotted the frequency of each sector as a wind rose.

Findings

The wind rose shows that strong winds most frequently come from the west–northwest quadrant (W, WNW, NW). Other directions occur much less often during high-wind conditions. This indicates that when gale-force winds affect the Gulf of Maine, they are predominantly westerly to northwesterly.

In summary, the prevailing direction of strong winds near buoy 44013 is from the west–northwest.